CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory

NABL - Accredited Laboratory as per ISO / IEC-17025 :2005

T-2377

Job No.: CTCE/BBMP/W.No.09/MSM/CSR-02/777p/CEMENT/2014-15 Date: 02.03.2015

TEST REPORT ON CEMENT

* CUSTOMER	:	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
*AGENCY	:	**Mr. M. Srinivas Murthy,** #17, Opp Jyothi Gas Godown, 6th Cross, Kurubarahalli, Bangalore – 560 086.
*NAME OF THE WORK	:	Improvements to Drain & Asphalting to MES School Road in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
*REFERENCE	:	EE/BTP/BBMP/E-PMT/08(14149)WO/317/2014-15 Dated: 23.02.2015
SAMPLE ID	:	Cement
SAMPLE RECEIVED ON	:	28.02.2015
PERIOD OF TESTING	:	28.02.2015 to 02.03.2015

The results of the tests conducted on the cement sample are as follows:

Sl. No	Descriptions	Test Method as per IS	Test Result	Requirements as per IS: 8112-2013
1	Standard Consistency	IS-4031 (Part -4) 1988(RA-2009)	30.00 %	-
2	a) Initial Setting Time	IS-4031 (Part -5) 1988(RA-2009)	165 Minutes	Not Less than 30 Minutes
	b) Final Setting Time	IS-4031 (Part -5) 1988(RA-2009)	490 Minutes	Not More than 600 Minutes
3	Soundness by Le Chartlier Method	IS-4031 (Part-3) 1988(RA-2009)	1 mm	Not more than 10mm

*Information is furnished by the Customer/Representative.

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T-2377

Job No.: CTCE/BBMP/W.No.09/MSM/CSR-02/777p/SAND-Gradation/2014-15 : 02.03.2015

TEST REPORT ON DETERMINATION GRADATION OF FINE AGGREGATES

*** Customer** : **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

*** Agency** : **Mr. M. Srinivas Murthy,**
#17, Opp Jyothi Gas Godown, 6th Cross, Kurubarahalli, Bangalore – 560 086.

*** Name of Work** : Improvements to Drain & Asphalting to MES School Road in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.

Reference : EE/BTP/BBMP/E-PMT/08(14149)WO/317/2014-15 Dated: 23.02.2015

Technical Reference : IS : 2386 Part 1 - 1963 RA-2007

Sample ID : Fine Aggregates

Sample Received on : 28.02.2015

Date of Testing : 02.03.2015

Total Wt. of Aggregates in gms **1000**

Is Sieve Size in mm	Cumulative Weight Passing in %	Specific Limits as per IS 383-1970 (RA- 2007)			
		Zone-I	Zone-II	Zone-III	Zone-IV
10	100	100	100	100	100
4.75	94.00	90-100	90-100	90-100	95-100
2.36	77.50	60-95	75-100	85-100	95-100
1.18	55.70	30-70	55-90	75-100	90-100
600 Micron	29.20	15-34	35-59	60-79	80-100
300 Micron	15.70	5-20	8-30	12-40	15-50
150 Micron	7.70	0-10	0-10	0-10	0-15

* Information is furnished by the Customer/Representative

Remarks : This sample is under Zone-I specific limits.

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Job No.: CTCE/BBMP/W.No.09/MSM/CSR-02/777p/AGG/GR/2014-15 : 02.03.2015

TEST REPORT ON DETERMINATION GRADATION OF COARSE AGGREGATES

*** Customer** : **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

*** Agency** : **Mr. M. Srinivas Murthy,**
#17, Opp Jyothi Gas Godown, 6th Cross, Kurubarahalli, Bangalore – 560 086.

*** Name of Work** : Improvements to Drain & Asphalting to MES School Road in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.

Reference : EE/BTP/BBMP/E-PMT/08(14149)WO/317/2014-15 Dated: 23.02.2015

Technical Reference : IS : 2386 Part 1 -1963 RA-2007

Sample ID : Coarse Aggregates (40mm)

Sample Received on : 28.02.2015

Date of Testing : 02.03.2015

Total Wt. of Aggregates in gms= **5000**

Is Sieve Size in mm	Cumulative Weight Passing in %	Specific Limits as per IS 383-1970 (RA- 2007)	
		Graded	Single Sized
80	100	100	-
63	100	-	100
40	96.90	95-100	85-100
20	36.90	30-70	0-20
10	18.60	10-35	0-5
4.75	2.30	0-5	-

* Information is furnished by the Customer/Representative

Remarks : This sample is under Graded specific limits.

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T-2377

Job No.: CTCE/BBMP/W.No.09/MSM/CSR-02/777p/CC Solid Block/2014-15 : 05.03.2015

TEST REPORT ON SOLID CONCRETE BLOCKS

***Customer** : **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

***Agency** : **Mr. M. Srinivas Murthy,**
#17, Opp Jyothi Gas Godown, 6th Cross, Kurubarahalli, Bangalore – 560 086.

***Name of the Work** : Improvements to Drain & Asphalting to MES School Road in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.

***Reference** : EE/BTP/BBMP/E-PMT/08(14149)WO/317/2014-15 Dated: 23.02.2015

Sample Received on : 28.02.2015

Date of Testing : 05.03.2015

Size of Blocks : 400mm x 200mm x 200mm

Cross Sectional Area : 80000 mm^2

Technical Reference : IS: 2185 (Part 1) - 2005

No. of Blocks Tested : 08

Sl.No.	Block ID	Wt. in Kg	Failure load (KN)	Compressive strength (N/mm^2)	Requirement as per IS 2185 (Part 1) - 2005
1	Block 1	36.35	262.3	3.28	Minimum required Compressive Strength of Individual Units 3.20 N/mm^2
2	Block 2	34.15	264.1	3.30	
3	Block 3	35.18	262.5	3.28	
4	Block 4	36.34	262.3	3.28	
5	Block 5	35.15	265.3	3.32	
6	Block 6	35.12	262.4	3.28	
7	Block 7	36.33	262.1	3.28	
8	Block 8	35.18	258.9	3.24	

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Job No.: CTCE/BBMP/W.No.09/MSM /STEEL/2016-17 09.03.2015

TEST REPORT ON REINFORCEMENT STEEL

Customer	:	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	:	**Mr. M. Srinivas Murthy,** #17, Opp Jyothi Gas Godown, 6th Cross, Kurubarahalli, Bangalore – 560 086.
Name of the Work	:	Improvements to Drain & Asphalting to MES School Road in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	:	EE/BTP/BBMP/E-PMT/08(14149)WO/317/2014-15 Dated: 23.02.2015
Date of Test	:	09.03.2015
Technical Reference	:	IS: 1786-2008

Sl. No	Nominal size (dia) (mm)	Mass per metre (Kg/mtr)	TENSILE STRENGTH			Bend Test	Rebend Test
			0.20% proof stress/Yield stress N/mm^2	Tensile strength (Ultimate stress) N/mm^2	Elongation percent gauge length		
1	10	0.62	513	556	13.25	O.K	O.K

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JAS-ANZ BSCIC ISO 9001 REGISTERED

Job No.: CTCE/BBMP/W.No.09/MSM /STEEL/2016-17 09.03.2015

TEST REPORT ON REINFORCEMENT STEEL

Customer	:	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	:	**Mr. M. Srinivas Murthy,** #17, Opp Jyothi Gas Godown, 6th Cross, Kurubarahalli, Bangalore – 560 086.
Name of the Work	:	Improvements to Drain & Asphalting to MES School Road in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	:	EE/BTP/BBMP/E-PMT/08(14149)WO/317/2014-15 Dated: 23.02.2015
Date of Test	:	09.03.2015
Technical Reference	:	IS: 1786-2008

Sl. No	Nominal size (dia) (mm)	Mass per metre (Kg/mtr)	TENSILE STRENGTH			Bend Test	Rebend Test
			0.20% proof stress/Yield stress N/mm^2	Tensile strength (Ultimate stress) N/mm^2	Elongation percent gauge length		
1	12	0.89	515	558	13.35	O.K	O.K

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T-2377

Job No.: CTCE/BBMP/W.No.09/MSM/CSR-02/777p/CUBE/2014-15 09.04.2015

TEST REPORT ON COMPRESSIVE STRENGTH OF CONCRETE CUBES

*** Customer** : **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

*** Agency** : **Mr. M. Srinivas Murthy,** #17, Opp Jyothi Gas Godown, 6th Cross, Kurubarahalli, Bangalore – 560 086.

*** Name of the work** : Improvements to Drain & Asphalting to MES School Road in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.

*** Reference** : EE/BTP/BBMP/E-PMT/08(14149)WO/317/2014-15 Dated: 23.02.2015

*** Sample ID** : Cement Concrete

Size of cubes : 150mmx150mmx150mm

Cross Sectional Area : 22500 mm^2

Technical Reference : IS: 516-1959 (Reaffirmed 2008)

*** Grade of Concrete** : M_{15}

Compressive Strength as on : 28th day

Sample Received on : 09.04.2015

Sl.No.	* Date of casting	Date of testing	Weight of cube (Kg)	Failure load (KN)	Compressive strength (N/mm^2)
1	12.03.2015	09.04.2015	8.189	365.6	16.25
2	12.03.2015	09.04.2015	8.226	378.5	16.82
3	12.03.2015	09.04.2015	8.337	390.2	17.34

* Information is furnished by the Customer/Representative

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Job No.: CTCE/BBMP/W.No.09/MSM/CSR-02/777p/CUBE/2014-15 20.04.2015

TEST REPORT ON COMPRESSIVE STRENGTH OF CONCRETE CUBES

*** Customer** : **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

*** Agency** : **Mr. M. Srinivas Murthy,** #17, Opp Jyothi Gas Godown, 6th Cross, Kurubarahalli, Bangalore – 560 086.

*** Name of the work** : Improvements to Drain & Asphalting to MES School Road in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.

*** Reference** : EE/BTP/BBMP/E-PMT/08(14149)WO/317/2014-15 Dated: 23.02.2015

*** Sample ID** : Cement Concrete

Size of cubes : 150mmx150mmx150mm

Cross Sectional Area : 22500 mm^2

Technical Reference : IS: 516-1959 (Reaffirmed 2008)

*** Grade of Concrete** : M_{20}

Compressive Strength as on : 28th day

Sample Received on : 20.04.2015

Sl.No.	* Date of casting	Date of testing	Weight of cube (Kg)	Failure load (KN)	Compressive strength (N/mm^2)
1	23.03.2015	20.04.2015	8.165	499.3	22.19
2	23.03.2015	20.04.2015	8.298	518.6	23.05
3	23.03.2015	20.04.2015	8.325	528.7	23.50

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Job No.: CTCE/BBMP/W.No.09/MSM/CSR-02/777p/C.C.Core/2014-15 25.03.2015

TEST REPORT ON CONCRETE CORE

* Name of Customer	:	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
* Name of Agency	:	**Mr. M. Srinivas Murthy,** #17, Opp Jyothi Gas Godown, 6th Cross, Kurubarahalli, Bangalore – 560 086.
* Name of work	:	Improvements to Drain & Asphalting to MES School Road in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
* Reference		EE/BTP/BBMP/E-PMT/08(14149)WO/317/2014-15 Dated: 23.02.2015
Techinical Reference	:	IS:516-1959 (Reaffirmed 2008), SP-24:1983.
Sample ID	:	Kerb stone
Sample Received on	:	20.03.2015
Date of Testing	:	25.03.2015

Sl. No.	Dia of Core D (mm)	Height of Core H (mm)	Core Wt (Kg)	Density of Core (kg / m^3)	H / D	Correction factor (Based on H/D)	Failure Load (kN)	Core Strength (N/mm^2)	Correction Factor for the Dia. (Strength of the Core x 1.08)	Corrected Cylinder Compressive Strength (N/mm^2)	Equivalent Cube Compressive Strength (N/mm^2)
1	50.00	78.00	0.385	2513.83	1.56	0.952	25.60	13.04	14.08	14.78	18.48
2	50.00	79.00	0.392	2527.14	1.58	0.955	26.30	13.39	14.47	13.81	17.26
3	50.00	80.00	0.399	2540.11	1.60	0.957	25.80	13.14	14.19	13.58	16.97

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Job No.: CTCE/BBMP/W.No.09/MSM/WMM/Gradation/2014-15

10.03.2015

GRADATION FOR WMM
MORTH TABLE-400-11

Customer : **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

Agency : **Mr. M. Srinivas Murthy,**
#17, Opp Jyothi Gas Godown, 6th Cross, Kurubarahalli, Bangalore – 560 086.

Name of Work : Improvements to Drain & Asphalting to MES School Road in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.

Reference : EE/BTP/BBMP/E-PMT/08(14149)WO/317/2014-15 Dated: 23.02.2015

Date of Testing : 10.03.2015

Material : WMM

Sample Location : WMM Mix Plant

Oven Dry Wt (gm): **5000**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	185	185	3.7	96.3	95-100
22.4	1530	1715	34.3	65.7	60-80
11.2	935	2650	53.0	47.0	40-60
4.75	625	3275	65.5	34.5	25-40
2.36	485	3760	75.2	24.8	15-30
0.600	385	4145	82.9	17.1	8-22
0.075	615	4760	95.2	4.8	0-8

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10.03.2015

GRADATION FOR WMM
MORTH TABLE-400-11

Customer : **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

Agency : **Mr. M. Srinivas Murthy,**
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Name of Work : Improvements to Drain & Asphalting to MES School Road in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.

Reference : EE/BTP/BBMP/E-PMT/08(14149)WO/317/2014-15 Dated: 23.02.2015

Date of Testing : 10.03.2015

Material : WMM

Sample Location : WMM Mix Plant

Oven Dry Wt (gm): **5000**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	165	165	3.3	96.7	95-100
22.4	1565	1730	34.6	65.4	60-80
11.2	1090	2820	56.4	43.6	40-60
4.75	865	3685	73.7	26.3	25-40
2.36	550	4235	84.7	15.3	15-30
0.600	300	4535	90.7	9.3	8-22
0.075	325	4860	97.2	2.8	0-8

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Job No.: CTCE/BBMP/W.No.09/MSM/WMM/Gradation/2014-15

10.03.2015

GRADATION FOR WMM
MORTH TABLE-400-11

Customer : **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

Agency : **Mr. M. Srinivas Murthy,**
#17, Opp Jyothi Gas Godown, 6th Cross, Kurubarahalli, Bangalore – 560 086.

Name of Work : Improvements to Drain & Asphalting to MES School Road in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.

Reference : EE/BTP/BBMP/E-PMT/08(14149)WO/317/2014-15 Dated: 23.02.2015

Date of Testing : 10.03.2015

Material : WMM

Sample Location : WMM Mix Plant

Oven Dry Wt (gm): **5000**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	215	215	4.3	95.7	95-100
22.4	1520	1735	34.7	65.3	60-80
11.2	900	2635	52.7	47.3	40-60
4.75	780	3415	68.3	31.7	25-40
2.36	485	3900	78.0	22.0	15-30
0.600	350	4250	85.0	15.0	8-22
0.075	485	4735	94.7	5.3	0-8

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Job No.: CTCE/BBMP/W.No.09/MSM/WMM/AIV/2014-15 10.03.2015

Aggregate Impact Value

IS: 2386 Part IV

Customer	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Mr. M. Srinivas Murthy,** #17, Opp Jyothi Gas Godown, 6th Cross, Kurubarahalli, Bangalore – 560 086.
Name of the Work	Improvements to Drain & Asphalting to MES School Road in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/08(14149)WO/317/2014-15 Dated: 23.02.2015
Source / Location	WMM Plant
Type of Mix	Wet Mix macadam
Date of Testing	10.03.2015

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	386	388	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	85	86	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	301	302	
4	Aggregate Impact value = percent fines	22.02	22.16	
	100* (W_2/W_1)%			**22.09**

Comments:

→ Maximum allowable Aggregate Impact value for Wet mix Macadam is 30%

Note:

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Job No.: CTCE/BBMP/W.No.09/MSM/WMM/AIV/2014-15 10.03.2015

Aggregate Impact Value

IS: 2386 Part IV

Customer	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Mr. M. Srinivas Murthy,** #17, Opp Jyothi Gas Godown, 6th Cross, Kurubarahalli, Bangalore – 560 086.
Name of the Work	Improvements to Drain & Asphalting to MES School Road in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/08(14149)WO/317/2014-15 Dated: 23.02.2015
Source / Location	WMM Plant
Type of Mix	Wet Mix macadam
Date of Testing	10.03.2015

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	394	395	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	82	83	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	312	312	
4	Aggregate Impact value = percent fines	20.81	21.01	
	100* (W_2/W_1)%			**20.91**

Comments:

→ Maximum allowable Aggregate Impact value for Wet mix Macadam is 30%

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Job No.: CTCE/BBMP/W.No.09/MSM/WMM/S-T/2014-15 10.03.2015

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Mr. M. Srinivas Murthy,** #17, Opp Jyothi Gas Godown, 6th Cross, Kurubarahalli, Bangalore – 560 086.
Name of Work	Improvements to Drain & Asphalting to MES School Road in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/08(14149)WO/317/2014-15 Dated: 23.02.2015
Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Wet Mix Macadam
Date of Testing	10.03.2015

Civil-tech Consultants & Engineers Bangalore

Result : Flakiness Index = **12.36%**

Elongation Index = **13.25%**

Result : Combined Flakiness & Elongation index 25.61%

Comments:

Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%

Note:

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Job No.: CTCE/BBMP/W.No.09/MSM/WMM/S-T/2014-15 10.03.2015

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Mr. M. Srinivas Murthy,** #17, Opp Jyothi Gas Godown, 6th Cross, Kurubarahalli, Bangalore – 560 086.
Name of Work	Improvements to Drain & Asphalting to MES School Road in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/08(14149)WO/317/2014-15 Dated: 23.02.2015
Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Wet Mix Macadam
Date of Testing	10.03.2015

Civil-Tech Consultants & Engineers Bangalore

Result : Flakiness Index = **12.35%**

Elongation Index = **13.60%**

Result : Combined Flakiness & Elongation index 25.95%

Comments:

Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%

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T-2377

Job No: CTCE/BBMP/W.No.09/MSM/CSR-02/777p/SDBC(QB)/2014-15 08.04.2015

TEST REPORT ON DETERMINATION OF BITUMEN CHARACTERISTICS

*CUSTOMER	:	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
*AGENCY	:	**Mr. M. Srinivas Murthy,** #17, Opp Jyothi Gas Godown, 6th Cross, Kurubarahalli, Bangalore – 560 086.
*NAME OF THE WORK	:	Improvements to Drain & Asphalting to MES School Road in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
REFERENCE	:	EE/BTP/BBMP/E-PMT/08(14149)WO/317/2014-15 Dated: 23.02.2015
*SAMPLE ID	:	Bitumen
DATE OF SAMPLING	:	06.04.2015
PERIOD OF TESTING	:	08.04.2015

The results of the tests conducted on the bitumen sample using for Semi Dense Bituminous Concrete.

Sl. No	Description	Test Method as per IS	Test Result	Requirement as per IS:73:2013
1	Penetration at 25 ^{0}C, 1/10 mm	IS :1203 -1978 (RA-2009)	88	80 to 100
2	Softening point, ^{0}C	IS :1205 -1978 (RA-2009)	45	Min. 40
3	Ductility at 27^{0}C, cm	IS :1208 -1978 (RA-2009)	100 >	Min. 75
4	Flash Point, ^{0}C	IS :1209 -1978 (RA-2009)	302	Min. 220

*Information is furnished by the Customer/Representative.

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VIDYARANI P.K.
Technical Manager

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Job No.: CTCE/BBMP/W.No.09/MSM/SDBC/AIV/2014-15 08.04.2015

Aggregate Impact Value

IS: 2386 Part IV

Customer	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Mr. M. Srinivas Murthy,** #17, Opp Jyothi Gas Godown, 6th Cross, Kurubarahalli, Bangalore – 560 086.
Name of the Work	Improvements to Drain & Asphalting to MES School Road in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/08(14149)WO/317/2014-15 Dated: 23.02.2015
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	08.04.2015

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	378	388	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	85	88	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	293	300	
4	Aggregate Impact value = percent fines 100* (W_2/W_1)%	22.49	22.68	22.58

Comments:

→ Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 27%

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Job No.: CTCE/BBMP/W.No.09/MSM/SDBC/AIV/2014-15 08.04.2015

Aggregate Impact Value

IS: 2386 Part IV

Customer	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Mr. M. Srinivas Murthy,** #17, Opp Jyothi Gas Godown, 6th Cross, Kurubarahalli, Bangalore – 560 086.
Name of the Work	Improvements to Drain & Asphalting to MES School Road in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/08(14149)WO/317/2014-15 Dated: 23.02.2015
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	08.04.2015

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	390	391	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	90	91	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	300	300	
4	Aggregate Impact value = percent fines $100^* (W_2/W_1)\%$	23.08	23.27	**23.18**

Comments:

→ Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 27%

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Job No.: CTCE/BBMP/W.No.09/MSM/SDBC/Shape_T/2014-15 08.04.2015

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Customer	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Mr. M. Srinivas Murthy,** #17, Opp Jyothi Gas Godown, 6th Cross, Kurubarahalli, Bangalore – 560 086.
Name of Work	Improvements to Drain & Asphalting to MES School Road in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/08(14149)WO/317/2014-15 Dated: 23.02.2015
Technical Reference	IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	08.04.2015

Result : Flakiness Index = **12.35%**

Elongation Index = **13.39%**

Result : Combined Flakiness & Elongation index **25.74%**

Comments:

→ Maximum allowable Flakiness & Elongation Index for Semi Dense Bituminous Concrete is 30%

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Job No.: CTCE/BBMP/W.No.09/MSM/SDBC/Shape_T/2014-15 08.04.2015

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Customer	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Mr. M. Srinivas Murthy,** #17, Opp Jyothi Gas Godown, 6th Cross, Kurubarahalli, Bangalore – 560 086.
Name of Work	Improvements to Drain & Asphalting to MES School Road in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/08(14149)WO/317/2014-15 Dated: 23.02.2015
Technical Reference	IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	08.04.2015

Civil-Tech Consultants & Engineers Bangalore

Result : Flakiness Index = **13.25%**

Elongation Index = **13.90%**

Result : Combined Flakiness & Elongation index **27.15%**

Comments:

→ Maximum allowable Flakiness & Elongation Index for Semi Dense Bituminous Concrete is 30%

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Job No.: CTCE/BBMP/W.No.09/MSM/SDBC/Stripping/2014-15 10.04.2015

Stripping Value of Road Aggregates (Static Immersion Test)

IS: 6241

Customer	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Mr. M. Srinivas Murthy,** #17, Opp Jyothi Gas Godown, 6th Cross, Kurubarahalli, Bangalore – 560 086.
Name of the work	Improvements to Drain & Asphalting to MES School Road in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/08(14149)WO/317/2014-15 Dated: 23.02.2015
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	10.04.2015

Type of binder : 80/100
Percentage of binder used : 5.0% by wt.
Total weight of aggregate : 200 g
Total weight of binder : 10.0 g
Temperature of water-bath : 40° C

Observation Number	Stripping, Percentage	Average, Percentage	Average Retained Coating, %
1	3.1	3.20	96.80
2	3.2		
3	3.3		

Comments:

→ Minimum allowable Aggregate retained coating for Semi Dense Bituminous Concrete is 95%

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Job No.: CTCE/BBMP/W.No.09/MSM/SDBC/Sp_Wa/2014-15 10.04.2015

Specific Gravity And Water Absorption Test

IS: 2386 Part III

Customer	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Mr. M. Srinivas Murthy,** #17, Opp Jyothi Gas Godown, 6th Cross, Kurubarahalli, Bangalore – 560 086.
Name of the Work	Improvements to Drain & Asphalting to MES School Road in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/08(14149)WO/317/2014-15 Dated: 23.02.2015
Type of Mix	Semi Dense Bituminous Concrete
Source / Location	Hotmix Plant, Bangalore
Date of Testing	10.04.2015

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	2005	2006	2007	
2	Weight of basket suspended in water	W_2 g	750	750	750	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1255	1256	1257	
4	Weight of saturated surface dry aggregate in air	W_3 g	2010	2011	2012	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_S)$ g	755	755	755	
6	Weight of oven dried aggregate	W_4 g	1995	1999	2000	
7	Specific Gravity	$W_4/(W_3-W_S)$	2.642	2.648	2.649	2.646
8	Apparent Specific gravity	$W_4/(W_4-W_S)$	2.696	2.690	2.692	2.693
9	Water Absorption	$((W_3-W_4)*100)/W_4$	0.75%	0.60%	0.60%	0.65%

Comments:

→ Maximum allowable Aggregate Water absorption value for Semi Dense Bituminous Concrete is 2.0%

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Job No.: CTCE/BBMP/W.No.09/MSM/SDBC/Bitumen/2014-15 10.04.2015

BITUMEN DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

AS per IRC : SP : 11 - 1984

CUSTOMER	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
AGENCY	**Mr. M. Srinivas Murthy,** #17, Opp Jyothi Gas Godown, 6th Cross, Kurubarahalli, Bangalore – 560 086.
NAME OF THE WORK	Improvements to Drain & Asphalting to MES School Road in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
REFERENCE	EE/BTP/BBMP/E-PMT/08(14149)WO/317/2014-15 Dated: 23.02.2015
SAMPLE I/D	MES School Road in Ward No.09, BBMP, Bangalore.
DATE OF TESTING	10.04.2015

BITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	475	474
3. Weight of Asphalt and Mineral matter Extracted, g	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	25	26.00
7. Bitumen content in %	5.00	5.20
8. Average	**5.10**	

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Job No.: CTCE/BBMP/W.No.09/MSM/SDBC/Bitumen/2014-15 10.04.2015

GRADATION DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

As per IS : 2386 and IRC : SP : 11 - 1984

CUSTOMER	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
AGENCY	**Mr. M. Srinivas Murthy,** #17, Opp Jyothi Gas Godown, 6th Cross, Kurubarahalli, Bangalore – 560 086.
NAME OF THE WORK	Improvements to Drain & Asphalting to MES School Road in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
REFERENCE	EE/BTP/BBMP/E-PMT/08(14149)WO/317/2014-15 Dated: 23.02.2015
SAMPLE I/D	MES School Road in Ward No.09, BBMP, Bangalore.
DATE OF TESTING	10.04.2015

GRADATION AFTER EXTRACTION

Sieve Size in mm	Trail 1				Specified Limits as per MORTH specification table 500-15 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
13.2	0	0	0	100	100
9.5	30.25	6.37	6.37	93.63	90-100
4.75	262.5	55.26	61.63	38.37	35-51
2.36	55.26	11.63	73.27	26.73	24-39
1.18	44.35	9.34	82.60	17.40	15-30
0.3	25.25	5.32	87.92	12.08	9-19
0.075	30.22	6.36	94.28	5.72	3-8

Sieve Size in mm	Trail 2				Specified Limits as per MORTH specification table 500-15 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
13.2	0	0	0	100	100
9.5	32.26	6.81	6.81	93.19	90-100
4.75	250.3	52.81	59.61	40.39	35-51
2.36	51.23	10.81	70.42	29.58	24-39
1.18	40.23	8.49	78.91	21.09	15-30
0.3	25.26	5.33	84.24	15.76	9-19
0.075	45.65	9.63	93.87	6.13	3-8

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Building & Highway Material Testing Laboratory

An ISO 9001:2008 Certified Company

NABL - Accredited Laboratory as per ISO / IEC-17025 : 2005

JAS-ANZ BSCIC ISO 9001 REGISTERED

Job No.: CTCE/BBMP/W.No.09/MSM/SDBC/AGG/2015-16 10.04.2015

Aggregate Gradation Test

IS : 2386 Part I

Customer	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Mr. M. Srinivas Murthy,** #17, Opp Jyothi Gas Godown, 6th Cross, Kurubarahalli, Bangalore – 560
Name of the Work	Improvements to Drain & Asphalting to MES School Road in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/08(14149)WO/317/2014-15 Dated: 23.02.2015
Sample I / D	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete (SDBC)
Date of Testing	10.04.2015

Total Weight of Sample: **5350** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Grade-II As per MORTH	Remarks
13.2	0	0.0	0	100	100	Gradation satisfies Grade II MORTH specification
9.5	330	6.2	6.17	93.83	90-100	
4.75	2685	50.2	56.36	43.64	35-51	
2.36	650	12.1	68.50	31.50	24-39	
1.18	410	7.7	76.17	23.83	15-30	
0.3	425	7.9	84.11	15.89	9-19	
0.075	450	8.4	92.52	7.48	3-8	

Total Weight of Sample: **5450** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Grade-II As per MORTH	Remarks
13.2	0	0.0	0	100	100	Gradation satisfies Grade II MORTH specification
9.5	330	6.1	6.06	93.94	90-100	
4.75	2950	54.1	60.18	39.82	35-51	
2.36	625	11.5	71.65	28.35	24-39	
1.18	420	7.7	79.36	20.64	15-30	
0.3	500	9.2	88.53	11.47	9-19	
0.075	330	6.1	94.59	5.41	3-8	

Note:

- This test report should not be reproduced except in full, without written approval of the laboratory.
- The results indicated above are based on the tests carried out on the samples received in the laboratory.
- Any Query regarding the report must be reported within 30 days from the date of testing

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Job No.: CTCE/BBMP/W.No.09/MSM/SDBC/Stability/2014-15 10.04.2015

TEST REPORT ON STABILITY OF MIX

Customer	:	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	:	**Mr. M. Srinivas Murthy,** #17, Opp Jyothi Gas Godown, 6th Cross, Kurubarahalli, Bangalore – 560 086.
Name of the Work	:	Improvements to Drain & Asphalting to MES School Road in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	:	EE/BTP/BBMP/E-PMT/08(14149)WO/317/2014-15 Dated: 23.02.2015
Source of location	:	Hot mix Plant, Bangalore
Type of Mix	:	Semi Dense Bituminous Concrete
Date of Testing	:	10.04.2015

The results of the tests conducted on the Semi Dense Bituminous Concrete mix sample are as follows:

Sl. No	Description	Test Result 1	Test Result 2	Requirement as per MORTH (Table 500-16)
1	Marshal Stability, Kn	8.25	8.55	8.2 Kn (min)
2	Marshal flow, mm	2.45	3.35	2 – 4
3	Percent air voids in Mineral Aggregate	3.25	4.10	3 – 5
4	Voids in Compacted Mix	13.65	13.90	13 – 15
5	Percent Voids filled with Bitumen	67.55	68.55	65 - 78
6	Density, g/cc	2.26	2.27	--

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Note:

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